

REMARKS

The Examiner's recognition of Applicants' invention by the allowance of claims 22 and 23 is gratefully acknowledged.

Claim 1 is amended to more particularly point out that the sensing element is formed of a plurality of ceramic layers arranged and fired to form a planar structure having an end, as shown in Figs. 1 and 2 and described at paragraphs 0023, 0024 and 0040. Also, claim 1 is amended to more particularly point out that the first and second sockets extend from the end to define the recited chambers and that the first and second leads have a surface exposed within the socket, as shown in Figs. 2 and 3 and described in paragraph 0024.

Claim 3 is amended to more particularly point out that the recited heater sockets extend from the end and that the recited heater leads have surfaces exposed within the sockets for contact with the heater terminal elements, as shown in Figs. 2 and 3 and described at paragraphs 0022 and 0037.

The grammar in claim 7 is amended.

Claims 11, 12 and 15 are amended to recite features similar to claim 1, including that the sensing element is formed of a layered planar structure having an end from which the sockets extend.

Claim Rejection under 35 USC § 103

Claims 1-8 and 11-21 were rejected under 35 U.S.C. § 103 as unpatentable over United States Patent No. 5,344,545, issued to Tsukada et al. in 1994, in view of United States Patent No. 5,490,412, issued to Duce et al. in 1996.

Referring to Figs. 1, 2 and 5, Tsukada et al. describes a gas sensor that includes cut-outs 12 and anodes 13 exposed at the cut-outs, col. 6, lines 57-59. Each anode comprises a terminal portion 131 that includes a through-hole 13a, col. 6, lines 61-63. External electrical connections are made by connecting leads 29 having ends inserted in through-holes 13a. In contrast, Applicants' invention provides sockets that extend from an end of the planar, ceramic structure for receiving terminal elements. The leads in Applicants' sensing element have surfaces exposed within the sockets for contact with the terminal elements. In this manner, Applicants' invention eliminates the need for through-holes or vias, see paragraph 0025 and 0044. Tsukada et al. does not provide a socket extending from an end of the sensing element for receiving a terminal, and so does not teach or suggest Applicants' invention.

Duce et al. describes an oxygen sensor formed from plurality of planar ceramic layers, see Fig. 5 and beginning at col. 3, line 31. Referring to Fig. 3, electrical connections are made by terminals 50 that include pads 52 welded to the contacts at the major surfaces of the sensing element, col. 2, lines 52-54. In the embodiment in Fig. 6, wires are welded to electrical terminals 102 and 104, col. 3, lines 53-56; whereas in Fig.

7, connections are made by terminals 146 and 148 that contact the major faces. Thus, nothing in Duce et al. shows a sensing element having sockets in the end to receive terminals elements.

Thus, neither Tsukada et al. nor Duce et al. show a sensing element with sockets extending from the end for receiving terminals elements. Without this feature, the references, even when combined, do not point the practitioner to Applicants' invention.

Claim 1 is directed to Applicants' sensor that comprises a sensing element formed of a plurality of ceramic layers arranged and fired to form a planar structure having an end. In accordance with the claim, the sensing element comprises first and second sockets that extend from the end and define chambers for receiving terminal elements. Tsukada et al. makes electrical connections using through-holes in the major face of the layer. Duce et al. shows connections to the major faces of the sensing element. Neither reference shows connections through sockets in the end of the sensing element. Thus, the references do not teach or suggest Applicants' sensor in claim 1.

Claims 2-8 are dependent upon claim 1 and so not taught or suggested by the references at least for the reasons set forth with regard to that claim.

Claim 11 is directed to a sensor similar to claim 1, but with additional features preferred in the practice of Applicants' invention. The sensor comprises a sensing element having an end and sockets extending from the end for receiving terminal elements, features similar to claim 1. For the reasons above, Tsukada et al. and Duce et

al do not show Applicants' sensor in claim 11.

Claim 15 is directed to Applicants' method for making a sensor that includes arranging a plurality of ceramic layers to form a planar structure having an end, forming first and second sockets extending from the end, and firing. For the reasons above, Tsukada et al. and Duce et al. do not form sockets extending from the end, and so do not teach or suggest Applicants' method in claim 15, or claims 16-21 dependent thereon.

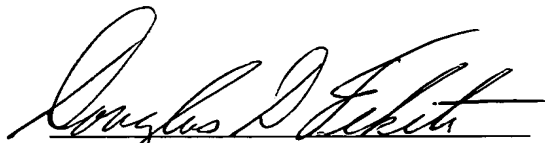
Accordingly, it is respectfully requested that the rejection of the claims based upon Tsukada et al. and Duce et al. be reconsidered and withdrawn, and that the claims be allowed.

Conclusion

Claims 22 and 23 having been allowed, it is believed, in view of the amendments and remarks herein, that the rejection of the remaining claims has been addressed and overcome, and that all claims are in condition for allowance. If it would further prosecution of the application, the Examiner is urged to contact the undersigned at the phone number provided.

The Commissioner is hereby authorized to charge any fees associated with this communication to Deposit Account No. 50-0831.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Douglas D. Fekete", written over a horizontal line.

Douglas D. Fekete
Reg. No. 29,065
Delphi Technologies, Inc.
Legal Staff – M/C 480-410-202
P.O. Box 5052
Troy, Michigan 48007-5052

(248) 813-1210